Recent Progress in the Development of Indicators

H. Theodore Heintz, Jr.
White House Council on Environmental Quality
May 18, 2004

U.S. Indicator Efforts Since Rio

- Sustainable Development Indicator Group
- Montreal Criteria and Indicators for Sustainable Forest Management
- Sustainable Resource Management Roundtables for Forests, Rangelands, Minerals, and Water Resources

U.S. Efforts Since Rio

- Heinz Center Report on the State of the Nation's Ecosystems
- EPA Draft Report on the Environment
- Many State Governments, Communities, Tribes and Private Sector Groups

Indications of Wider Interest

- Bureau of Environmental Statistics
  in the EPA elevation bill
- National Academies' Key National Indicators Initiative
- On-going work by GAO at the request of Senator Brownback and
  Congressman Boehlert
- Many international efforts

Other Efforts

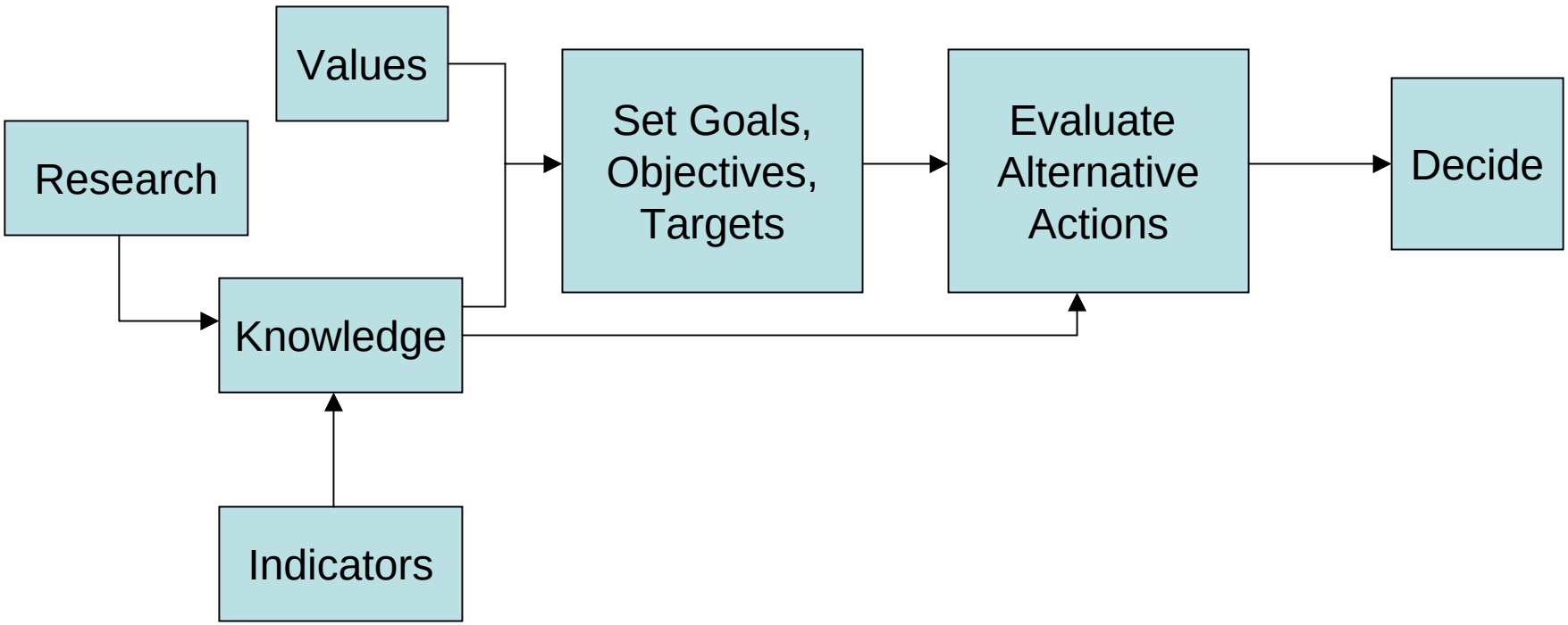
- UNCSD
- OECD
- World Economic Forum
- IISD Dashboard
- Well-being of Nations

Indicators can provide:

- Better, factual basis for decision making

- Performance measures for
  - Strategic planning
  - Priority setting and budgeting
  - Adaptive management
  - Accountability
  - Program evaluation

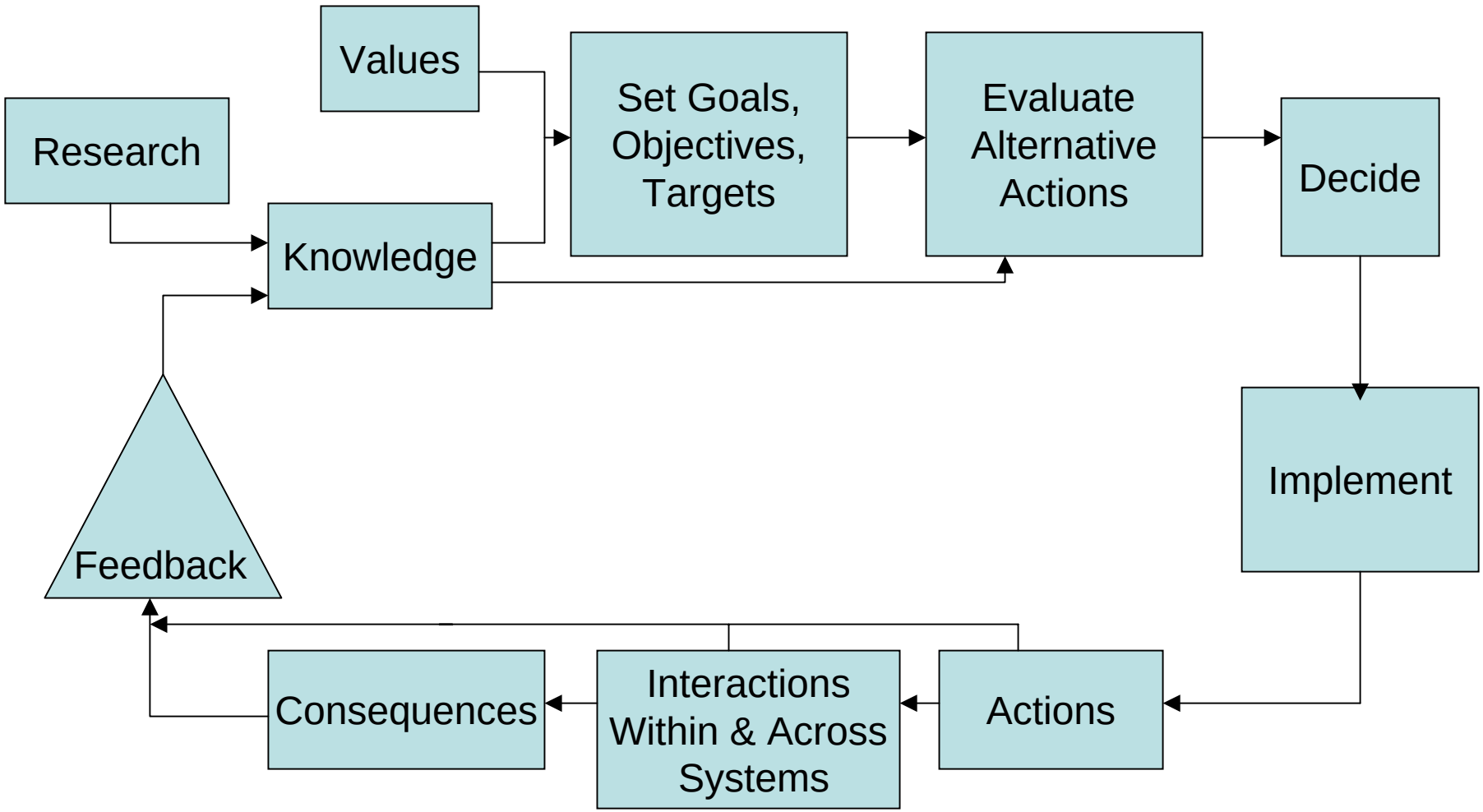
Indicators in the Decision Process



A Broader Vision of the Role of Indicators

- Based on three observations:
  - Decisions are based on “what we all know,’ not just the factual information prepared for decision makers.
  - Decisions occur in many different contexts in our society, not just at high levels in the Federal government.
  - Decisions and actions are repetitive, allowing policies and management practices to evolve**.**

The Role of Feedback
In Policy, Planning and Management



Feedback is powerful and fundamental

- Everywhere we look, we see the power of a simple process:
  - Try various things
  - Watch what happens
  - Repeat what succeeds
  - Forget what doesn’t
  - Try some different things
  - Repeat, repeat, repeat

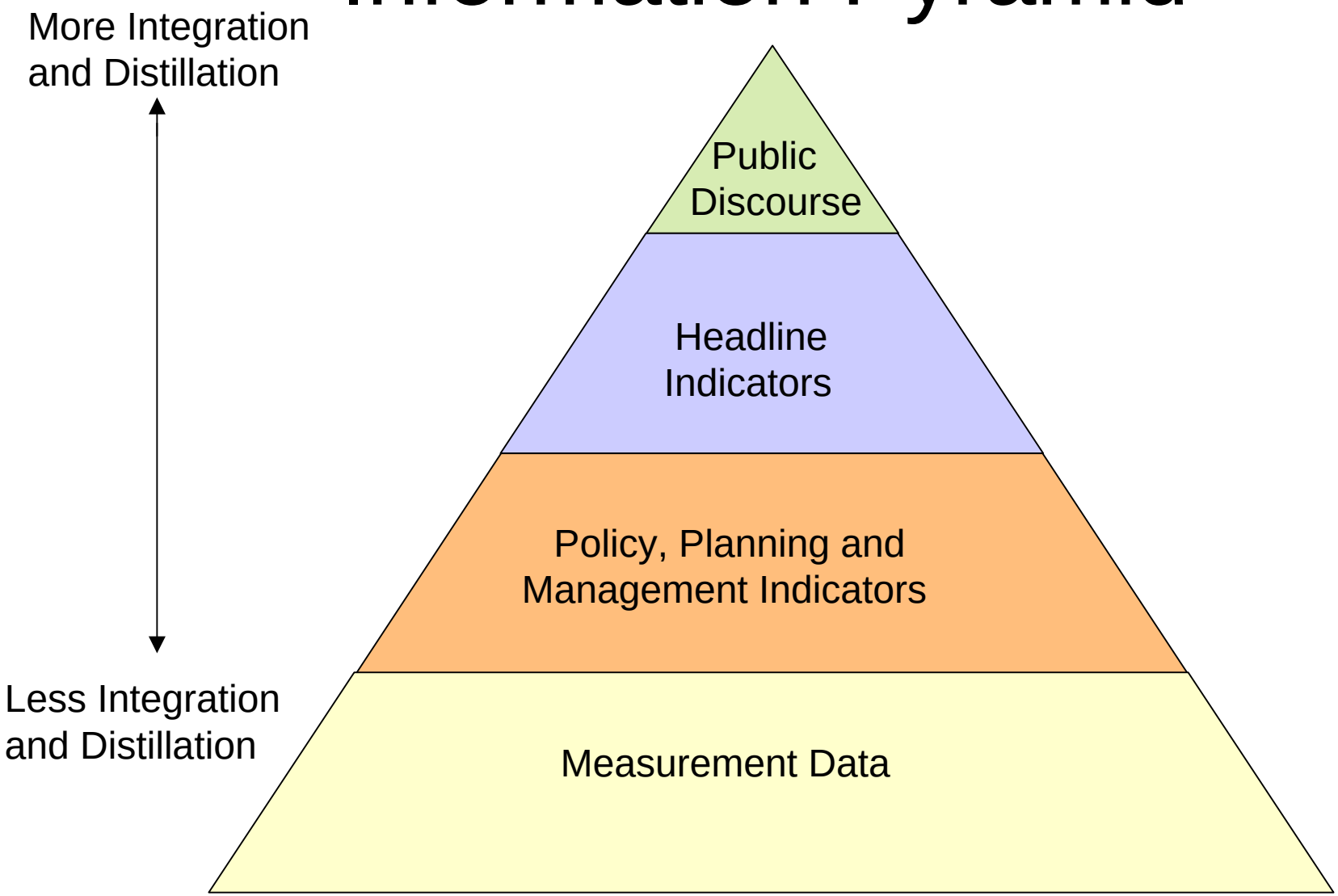
Feedback links consequences to decisions about what to repeat

- In biological evolution, feedback occurs as reproduction copies genetic information.
- In human culture, feedback occurs through constant chatter, through the stories we tell, the messages we send each other.
- Indicators add measured facts to make the stories more realistic.

Planning for A National System of Indicators On Natural and Environmental Resources

- Recognizes the value of regularly reported indicators
- Draws on the variety of ongoing indicators development efforts
- Need to build both the institutional and technical capacity for statistical reporting

Information Pyramid



Tier 1: Headline Indicators

- Relatively small number: ~25-30 indicators
- Relevant to general conditions that people value
- Suitable for public discourse to build more widely shared understanding of conditions
- Address key questions

Tier 2: Policy, Planning and Management Indicators

- Significantly more indicators: ~300
- Relevant to specific environmental conditions, important causal processes and effects on humans.
- Suitable for policy development, planning, management and performance measurement.

Categories for Policy, Planning and Management Indicators

System Elements:

Subsystems:	States	Processes	Effects on Humans
Environmental			
Economic			
Social			

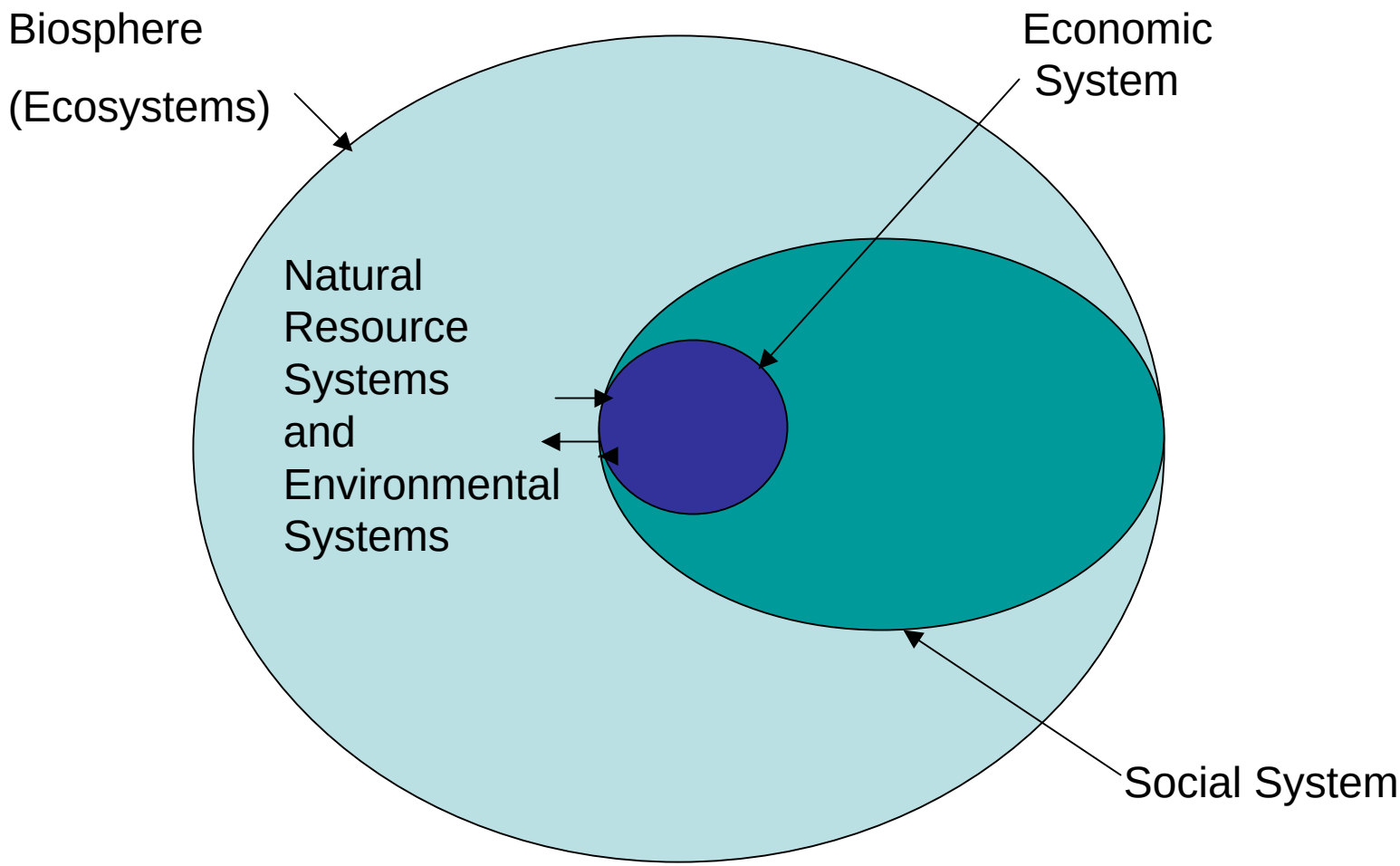
Tier 3: Detailed Data

- Many data sets for measurements of characteristics relevant to indicators
- Used to produce Tier 1 and 2 indicators
- Suitable for analysis and research to improve knowledge of cause and effect relationships and complex interactions

Using Systems Concepts

- To identify and organize indicators
- To provide a common conceptual framework to promote greater consistency and convergence
- To facilitate integration and synthesis of indicators in assessment and diagnosis

The Systems Perspective



Subsystems of the Biosphere

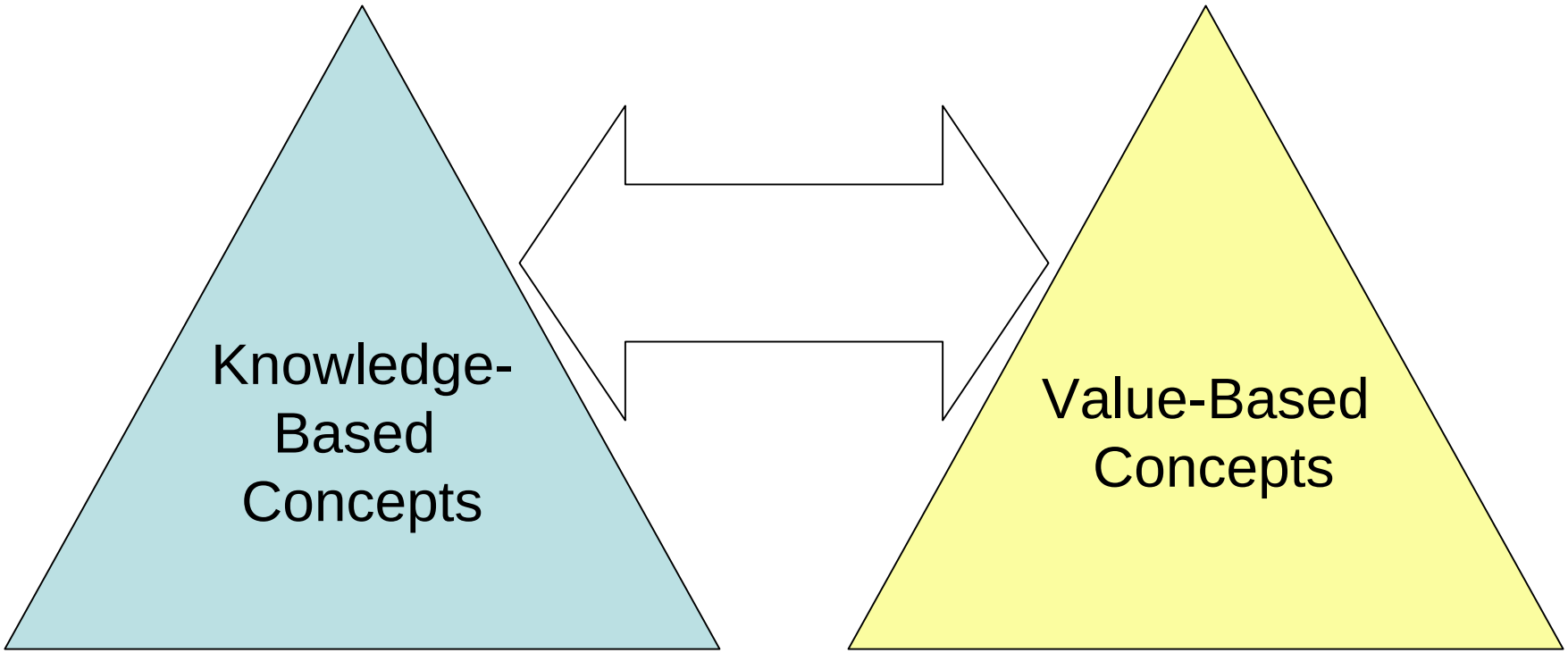
- Physical systems
  - Atmospheric
  - Hydrologic
  - Soils
  - Oceanic
  - Geologic, geochemical, geomorphological
- Socio-economic systems
  - Economic systems
  - Governance systems
  - Communities and families

Types of Ecosystems

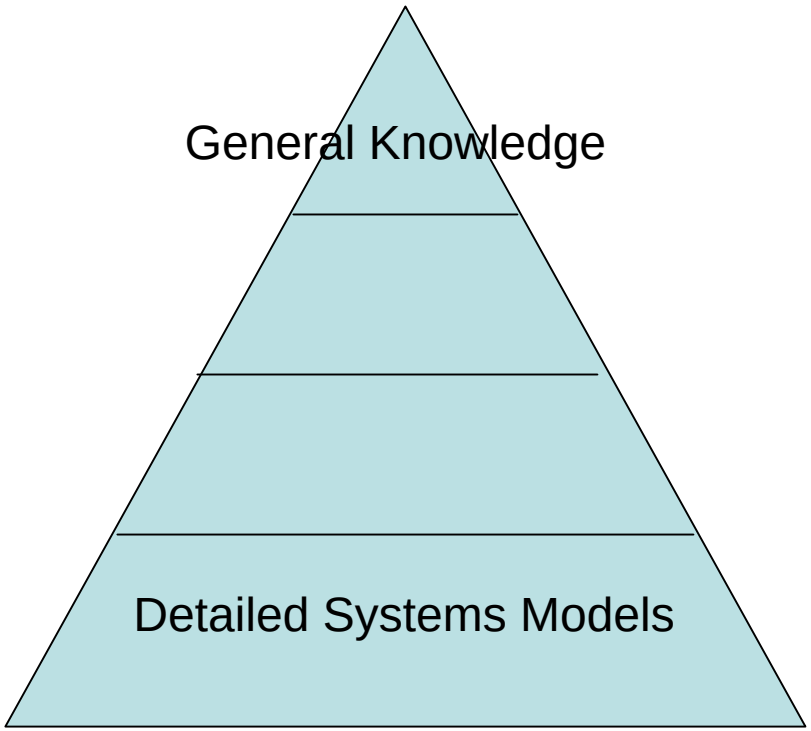
- Forests
- Grass and Shrub lands
- Croplands
- Freshwater
- Coastal and Oceans
- Urban and Suburban

Source: Heinz Center Report

Two Hierarchical Bases for Assessment

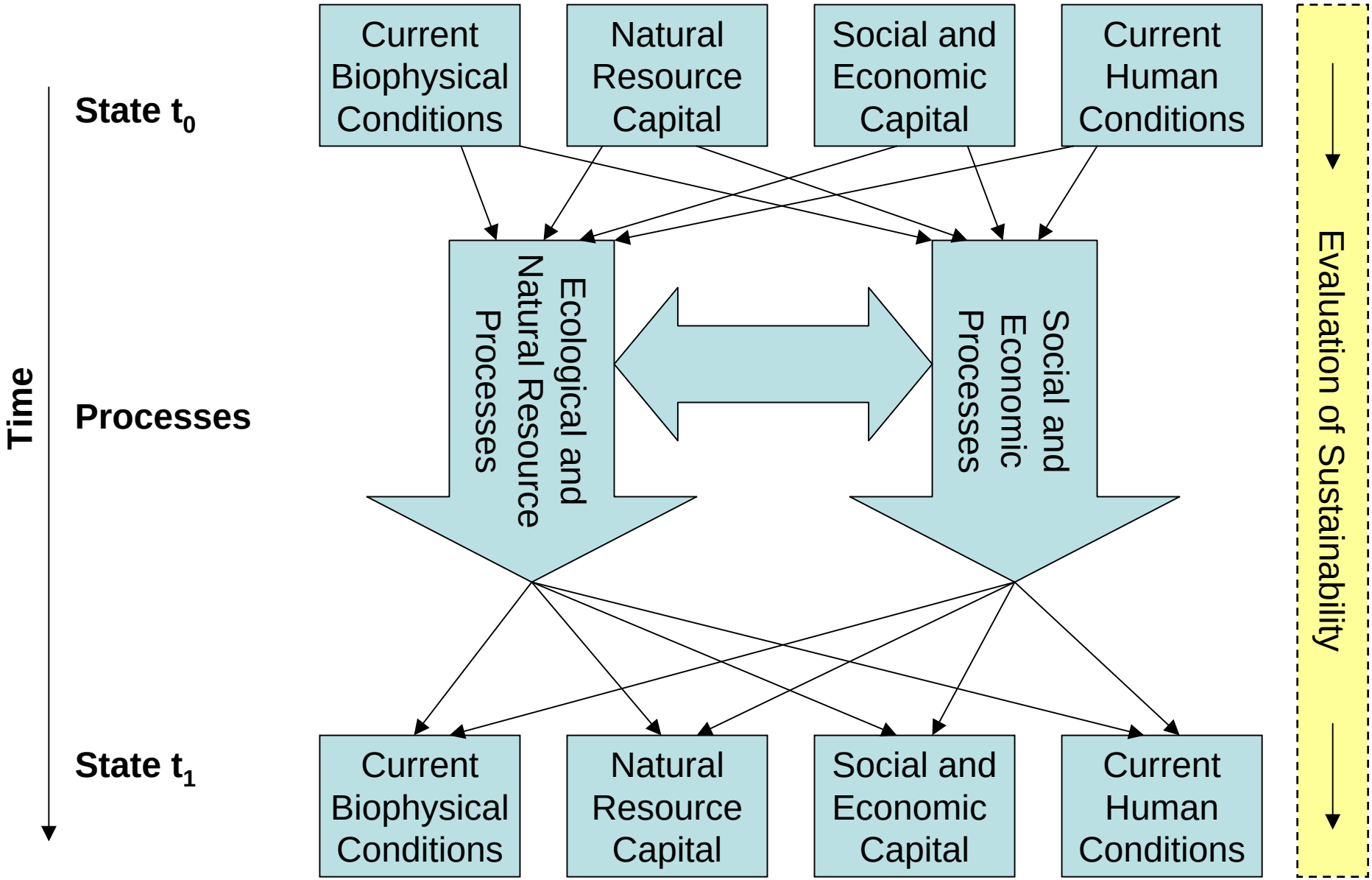


Higher Detail at Lower Tiers



Knowledge-Based Concepts

Value-Based Concepts



Spokane Model for Tier 1

Examples of Possible Tier 2 Categories for Current Biophysical Conditions

- Air
- Water
- Soils
- Rocks
- Plants and Animals

Examples of Possible Tier 3 Categories for Air

- Climate
- Stratospheric Ozone Concentration
- Surface Pollutant Concentrations
- Visibility